

Open source tools for image analysis and visualization

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Bioimage computing involves a wide variety of software tools, from analysis to visualisation. We present a comprehensive framework of open source libraries and end-user graphical interfaces dedicated to image processing. We choose a set of tools that provides cross-platform and multilanguage support, essential conditions for a wide spread in the community. Combining these tools allows for developing applications that provide cutting-edge processing algorithms as well as complex yet user-friendly human interactions.

First we present the Insight Toolkit (ITK), an image segmentation and registration toolkit. We show how the open source community contributes with state-of-the-art algorithms and how it can be used in a user-specific application. ITK is highly extensible thanks to a generic coding approach and proposes several script languages bindings.

Then we present two visualisation solutions: VTK (Visualization Toolkit) and SlideAtlas. The former is a scientific visualisation library with 3D interaction capabilities while the latter is a web-based software dedicated to massive 2D images exploration. Visualisation is a critical task in the image processing field, as it stands at the interface between human, data and system.

Finally, we show several end-user applications harnessing the previous analysis and visualisation tools. These applications provide graphical user interfaces and are often seen as collaborative platforms for image analysis research. A short analysis of their architectures gives the keys to the design of personalised bioimage analysis tools.